sequence of his own principles, as he refused for many years to admit the consequences of Faraday's experiments; but at least he can surely rely upon this admission being the last he will ever be called upon to make.   No phase of hyper-substance more subtle than thought can ever be conceived, since it could exist only as his own thought returning into itself.   Possibly, in the inconceivable domains of abstraction, the ultimate substance may show other sides or extensions, but to man it can be known only as hyperthought,—the region of pure mathematics and meta-physics,—the last and universal solvent.

"There even mathematics must stop.   Motion itself, ended; even thought became merely potential in this final solution.   The hierarchy of phases was complete."

ARTICLES IN CURRENT PERIODICALS.

ANNALS OF MATHEMATICS, second series, volume 21, no. 2, December, 1919 (published February, 1920): "A property of cyclotomic integers and its relation to Fermat's last theorem" by H. S. Vandiver, 73–80; "Surfaces of rotation in a space of four dimensions" by C. L. E. Moore, 81–93; "The circle nearest to n given points, and the point nearest to n given circles" by J. L. Coolidge, 94–97; "Singular solutions of differential equations of the second order" by E. M. Coon, 98–103; "Note on a class of integral equations of the second kind" by C. E. Love, 104–117; "Concerning sense on closed curves in non-metrical plane analysis situs" by J. R. Kline, 118–119; "On the theory of summability" by G. James, 120–127; "On the consistency and equivalence of certain generalized definitions of the limit of a function of a continuous variable" by L. L. Silverman, 128–140.

BULLETIN OF THE AMERICAN MATHEMATICAL SOCIETY, volume 26, no. 4, January, 1920: "The October meeting of the American Mathematical Society" by F. N. Cole, 145–151; "The October meeting of the San Francisco Section" by B. A. Bernstein, 152–155; "On the proof of Cauchy's integral formula by means of Green's formula" by J. L. Walsh, 155–157; "A set of completely independent postulates for the linear order η" by M. G. Gaba, 158–159; "Certain properties of binomial coefficients" by W. D. Cairns, 160–164; "The work of Poincaré on automorphic functions" [review of *Oeuvres de Henri Poincaré*, tome II (Paris, 1916)] by G. D. Birkhoff, 164–172; "A brief account of the life and work of the late Professor Ulisse Dini" by W. B. Ford, 173–177; "Shorter Notices," 177–183; "Notes," 184–188; "New publications," 189–192—No. 5, February: "Integro-differential equations with constant limits of integration" by I. A. Barnett, 193–203; "On a pencil of nodal cubics" by N. Altshiller-Court, 203–211; "Definition and illustration of new arithmetical group invariants" by E. T. Bell, 211–223; "Matrices and determinoids" [review of C. E. Cullis's *Matrices and Determinoids* (Cambridge, 1913–1918)] by J. B. Shaw, 224–233; "Notes," 233–237; "New publications," 237–240.

L'ENSEIGNEMENT MATHÉMATIQUE, volume 20, no. 6, January, 1920: "Sur l'élimination algébrique" by C. Riquier, 405–421; "Nouveaux théorèmes sur le viriel de forces et leurs applications géométriques et mécaniques" by F. Boulad, 421–432; "Sur les foyers rationnels d'une courbe algébrique" by E. Turrière, 433–436; Chronique, Bibliographie, Bulletin Bibliographique, 436–462; Table de Matières, 463–468; Supplément, "Spaco" by R. de Saussure, 12 pages [Specimen of the international language "Espérantide (conciliation de l'Esperanto et de l'Ido)." The first sentences are: "En spaco existas sep, kay nur sep, figuron, kiun estas nur pozician, t.e., kiun entenas nenia grando.   Lu estas (fig. 1): 1. La *punkto* (*P*). Irg ni punkto estas nura pozicio kay havas neni amplexo; punkto povas rotaci omnimanere sur si self, ne cestante esti la sama punkto.

2. La *reglo* (*R*), or rekta senfina linio, konsiderata kom spacelemento, kom nedivizibla tuto (kay ne kom serio de punkton).   Irg ni reglo estas nura pozicio kay enhavas nenia grando; reglo povas gliti or rotaci sur si self, ne cestante esti la sama reglo."].

THE MATHEMATICS TEACHER, volume 12, no. 2, December, 1919: "Certain undefined elements and tacit assumptions in the first book of Euclid's Elements" by H. E. Webb, 41–60; "Association of mathematics teachers of New Jersey.   Report of the committee of first-year high-school mathematics," 61–74; "New books," 75–76; "Notes and News," 77–88.

MONIST, volume 30, no. 1, January, 1920: "The analytical treatment of Newton's problems" by P. E. B. Jourdain, 19–36 [First paragraph: "It is a great help to the proper understanding of the meaning of Newton's propositions to consider the formulation of these propositions in analytical language.   In this article, after a mention is made of Leibniz's analytical work of 1689 (§ I), Varignon's of 1690 (§ II), Maclaurin's of 1742 (§ III), and of some work of Johann Bernoulli, Keill, Hermann, and others near the beginning of the eighteenth century (§ IV), the contributions

of Lagrange (1788) and the integrals of the dynamical equations are considered in greater detail (§§ V, VI). In connection with these integrals, the problems of the first three and then two bodies are treated in the most general way possible (§ VII), and, in § VIII, a single case of integration noticed by Jacobi is given and some further simplifications added. In § IX a short analytical summary of much of Newton's work on the dynamics of a particle is given. In § X the work of Möbius, Hamilton, and Grassmann on vector methods, which is of such great importance to analytical mechanics, is indicated, and the logical problem of the principles of mechanics and the light thrown on it by this work are discussed"]; "Space and the world in space" by J. Dieserud, 37–56; "The new number of the cosmic sand. On the extent of the universe and the limits of space and time" by H. Friedenthal, 57–69.

NOUVELLES ANNALES DE MATHÉMATIQUES, volume 78, November, 1919: "Cyclides du quatrième degré" by R. Dontot, 401–417; "Théorème sur les courbes planes" by R. Bricard, 418–421; "Triangles et quadrilatères de Poncelet" by G. Fontené, 421–424; "Distance du centre de la sphère circonscrite, au centre de gravité du tétraèdre" by V. Thebault, 424–426; "Sur l'aire d'un polygone" by V. Jamet, 426–435; Concours spécial d'admission à l'Ecole Polytechnique en 1919. Sujets de composition, 435–437; solutions de questions proposées, 437–440.

PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCE OF THE U. S. OF A., volume 5, no. 12, December, 1919: "Conditions necessary and sufficient for the existence of a Stieltjes integral" by R. D. Carmichael, 551–555; "Transformations of cyclic systems of circles" by L. P. Eisenhart, 555–757—Volume 6, no. 1, January, 1920: "The commutativity of one-parameter transformations in real variables" by A. C. Lunn, 24–26.

QUARTERLY JOURNAL OF PURE AND APPLIED MATHEMATICS, volume 48, no. 4, January, 1920: "A new solution of Waring's problem" (continued) by G. H. Hardy and J. E. Littlewood, 289–293; "A class of definite integrals" by S. Ramanujan, 294–310; "Motion of one solid on another" by A. B. Basset, 310–320; "Generalisation of a Theorem due to Sonine" by J. W. Nicholson, 321–329; "The value of the definite integral

$$\int_{-\infty}^{\infty} \frac{e^{at^2+bt}dt}{e^{ct} + d}\text{''}$$

by L. J. Mordell, 329–342; "On sequences of integers defined by recurrence relations" by R. D. Carmichael, 343–372; "On inverses of ∇^2 and other quadratic operators" by E. B. Elliott, 372–379; "Note on compound determinants expressible as simple determinants," T. Muir, 379–384.

REVISTA MATEMÁTICA HISPANO-AMERICANA, volume 1, no. 10, December, 1919:"Pedro Sanchez Ciruelo" by J. M. Lorente, 301–304; "Matemática de precisión y matemática de aproximación" by F. Klein, 305–314 [Translation of a lesson in his *Anwendung der Differential-und Integralrechnung auf Geometrie*, Leipzig, 1907]; "La sucesión de Fibonacci" (fourth article) by F.Vera, 315–322; "Restitución de una de las obras perdidas de Euclides" by V. R. y. Prósper, 323–325 [Refers among other works to R. C. Archibald's *Euclid's Book on Division of Figures* (1915)]; "Dos obras recientes sobre historia de la matemática" by G. A. Miller, 325–326 [Review of L. E. Dickson's *History of the Theory of Numbers*, volume 1 (1919) and F. Cajori's *History of Mathematics*, Revised edition (1919).

REVUE DE L'ENSEIGNEMENT DES SCIENCES, volume 13, nos. 125–126, May-June, 1919: "Sur l'égalité et la similitude des figures en géométrie plane" by J. Lemaire, 129–143; "A propos d'enveloppes" by F. Meyer, 143–145; "Premières leçons de géométrie" by J. Juhel-Rénoy, 146–154; "Sur les trièdres" by J. Juhel-Rénoy, 154–155; "Paul Chauvet" (1858–1918) by E. Brucker, 156–157; "Examens et concours de 1918 et de 1919," 158–173; "Bibliographie," 173–176.

REVUE SCIENTIFIQUE, volume 58, no. 2, January 24, 1920: "Carlo Bourlet, sa vie et son oeuvre (1866–1913)" by A. Boulanger, 42–45.

SCHOOL AND SOCIETY, volume 11, February 21, 1920: "Elementary statistics in high school mathematics as a socializing agency" by T. L. Kelley, 228–230.

SCIENTIFIC MONTHLY, volume 10, no. 4, April, 1920: "The measure of excellence in scientific activity" by R. D. Carmichael, 343–359.

TRANSACTIONS OF THE ACADEMY OF SCIENCE OF ST. LOUIS, volume 23, no. 9, March 2, 1920: "A study of the properties of integral numbers" and "New evidence of a relation between gravitation and electrical action, and of local changes in the electrical potential of the earth" by F. E. Nipher, 373–387